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A New Species of Salamander (*Plethodon*) from Southwestern Virginia

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The new *Plethodon* described below belongs to the *glutinosus* group and has been collected in abundance by both of us at the eastern edge of the Valley and Ridge Province.

Plethodon dixi, new species

Diagnosis. Similar to *Plethodon wehrlei* except in color and size as indicated.

Back: Covered with bronzy mottling and dotted with small, light flecks, which are usually present on the head, more numerous laterally, and on the tail. The mottling disappears in preservative and the flecks become less conspicuous. *P. wehrlei* lacks the mottling and only occasionally exhibits the whitish flecks; the young of this species, on the other hand, sometimes have paired, red, dorsal spots, a character never seen in the new form.

Belly: Mottled except on the chest and throat, which are usually almost devoid of dark pigment. In *wehrlei* the belly posterior to the chest is never mottled, whereas the chest and throat are either boldly mottled or uniformly dark.

Size: The new form is noticeably the smaller, its maximum dimensions (snout to anterior corner of vent plus tail) being 57+67 mm. The corresponding measurements for *wehrlei* are 72 and 80 mm.

Type. Chicago Natural History Museum 56510, a male from Dixie Caverns, Roanoke County, Virginia. This commercialized cave lies west-southwest of Salem, about midway between Salem and the western boundary of Roanoke County. The cave lies only a few hundred yards from the Roanoke River at an altitude of 1170 feet. The type and the larger series of

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CNHM paratypes (1 plus 86 specimens) were collected together on July 11, 1948, by John W. Funkhouser, Sarah H., C. H., Hallowell, and Whitney Pope.

Paratypes. CNHM 56511-56596, eighty-six topotypes collected as stated. just above; CNHM 56597-56609, thirteen topotypes collected. on July 19, 1948, by S. H. and C. H. Pope; U. S. Nat. Mus. 127239-127249, eleven topotypes collected by J. A. Fowler; Carnegie Mus. 26263, 29 topotypes collected by J. A. Fowler; Amer. Mus. Nat. Hist., twenty-two topotypes collected by C. M. Bogert, July 19, 1948; J. A. Fowler Coll. 1206-1207, eight topotypes collected by J. A. Fowler.

Range. Dixie Caverns and New Dixie Caverns, an uncommercialized cave in the same hill and only 440 yards from Dixie Caverns.

Description of Type. Adult male, 107 mm. in total length, 52 mm. from tip of snout to anterior angle of vent (the tail is slightly blunter than in most adult males). Body slender, tail round; head viewed from above broadly oval in outline, snout blunt; eyes prominent; 15 well-developed costal grooves, 16 when the indistinct one in groin is counted; 3 costal folds between appressed limbs; toes webbed at base; skin smooth; vomerine teeth 8-6; mental gland discernible; upper jaw with slight downward projection below each naris; vent with raised lips, their anterior half crossed by shallow grooves.

Dorsal surfaces and sides deep purplish black; back dotted with small, light flecks more numerous laterally, evident on head posteriorly, on upper surfaces of limbs, and especially on anterior half of tail. Lower sides from head through base of tail profusely marked with white spots variable in size, irregular in outline, and blending with mottling of belly but differing from it under low magnification. Belly posterior to chest profusely mottled, the darker element of the mottling lighter than the color of dorsum. Chest almost devoid of dark pigment, throat sparsely marked with it. Lower surface of limbs mottled like belly posterior to chest.

In life the back exhibited bronzy mottling, and the light flecks of the dorsal surfaces were more distinct.

Variation. Color: The relative intensity of the dorsal mottling of the 40 CNHM paratypes for convenience considered here as adult (snout-vent 57-38 mm.) was tabulated just after preservation with results as follows:

| | |
|------------------------|--------------|
| Relatively conspicuous | 11 specimens |
| Relatively faint | 28 specimens |
| Lacking | 1 specimen |

As already stated, this mottling disappears in preservative. At the same time these 40 specimens were divided into three categories on the basis of pro-

fusion of the light dorsal flecks on body and tail:

| | No. of Specimens | |
|---------------------------------|------------------|-----------------|
| | Body | Tail |
| Light flecks almost lacking | 7 | 2 |
| Light flecks moderately profuse | 23 | 9 |
| Light flecks profuse | 10 | 28 |
| Total | 40 | 39 (1 tailless) |

In this series the tail is the more profusely flecked. The 59 CNHM juveniles (snout-vent 33.5-22 mm.) were subjected to somewhat the same analysis except that, due to their smaller size, it was impractical to make as many categories:

| | No. of Specimens | |
|---|------------------|------|
| | Body | Tail |
| Light flecks almost lacking to moderately profuse | 38 | 38 |
| Light flecks profuse | 21 | 21 |
| Total | 59 | 59 |

Thus it is evident that there is an ontogenetic change in relative profusion of dorsal flecks on body and tail.

Close examination months after preservation (formalin in field, changed to alcohol in museum) shows that the dorsal flecks have lost some in intensity and that considerable variation in their distribution exists. Among the same 40 CNHM adults four had virtually lost all traces of dorsal flecks, one retained only traces along the upper sides; in 20 the flecks were distinct but most numerous along the upper sides, whereas in the remaining 15 they were evenly distributed over the back. In comparing the data taken at the time of preservation with those taken months later a positive correlation is by no means always evident. For example, one at first rated as having flecks of moderate intensity later proved to be devoid of them, and another first described as having flecks of maximum intensity later proved to have faint flecks numerous only laterally.

The bronzy mottling of the back also exhibits ontogenetic change for it is the more conspicuous in juveniles, giving them a relatively complex dorsal pattern.

Size: The measurements (snout-vent plus tail) of the five largest males follow: 57+67, 55.5+65.5, 55+63, 55+61, 55+58; the type was tenth in this respect. The four adult females measure 49.5+57.5, 47.5+60.5, 42+46, 40.5+ ?.

Vomerine Teeth: The sum of the two series in the nine males larger than the type ranges from 10 to 16, inclusive, with 14 and 16 duplicated.

Sexual Dimorphism: There are only four females among the 48 paratypes considered as adult (snout-vent 57-38 mm.) in the Chicago Natural History Museum and the United States National Museum. This in itself is a remarkable fact without a clear explanation. Females can be distinguished from males measuring more than 49 mm. from snout to vent by the lack of cloacal lips; in the smaller males the lips may be poorly developed or even lacking. This character is more evident on the posterior half of the vent because the transverse grooves crossing the lips anteriorly in the males suggest the beginning of the grooves that descend into the female's cloaca, which of course lacks the papillae found in the male's. Sexual difference in the projections of the snout below the nares is scarcely evident in this species. A mental gland is evident in the larger males but somewhat obscure. The sexual dimorphism of this new form is strikingly similar to that of *wehrlei*, not excepting the cloacal lips of the male.

We plan to publish in the near future a more detailed description of this new cave *Plethodon* along with an account of its life history and a discussion of its relationships. The "*Plethodon wehrlei*" reported from Dixie Caverns (Netting, Green, and Richmond, 1946) is undoubtedly our new form. We wish to withhold judgment on certain salamanders from the vicinity of near-by Blacksburg that are dealt with in this same paper.

A study of this salamander would not have been possible without the appreciation of scientific research and the friendly cooperation of James E. Comer, manager of Dixie Caverns. We wish to acknowledge our indebtedness to Mr. Comer and to thank John W. Funkhouser for escorting one of us to Dixie Caverns. The field work was done while the senior author was an investigator at Mountain Lake Biological Station, Virginia.

BIBLIOGRAPHY

Bishop, Sherman C.

- 1943 Handbook of salamanders. Ithaca (New York): Comstock Publ. Co. xiv+555 p., 144 fig., 56 maps.

Dunn, Emmet Reid

- 1926 The salamanders of the family *Plethodontidae*. Smith College Anniv. Publ. viii + 441 p., 3 pl., 86 maps.

Netting, M. Graham

- 1936 Wehrle's Salamander, *Plethodon wehrlei* Fowler and Dunn, in West Virginia. Proc. W. Virginia Acad. Sci., vol. 10, p. 89-93.

Netting, M. Graham, N. B. Green, and N. D. Richmond

- 1946 The occurrence of Wehrle's Salamander, *Plethodon wehrlei* Fowler and Dunn, in Virginia. Proc. Biol. Soc. Washington, vol. 59, p. 157-160.